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To the Governor of Maryland, the Board of Regents,
and the President of the University of Maryland:

I transmit herewith the Fifty-Seventh Annual Report of the University of Maryland Agricultural Experiment Station, as established by Act of Congress, March 2, 1887, containing an account of research and experiments conducted during the fiscal year ending June 30, 1944, and a statement of the receipts and disbursements for the same period.

W. B. KEMP,
Acting Director.

UNIVERSITY OF MARYLAND
AGRICULTURAL EXPERIMENT STATION

Volume 57 1943-1944

A Summary Of Wartime Research

Being

The Fifty-Seventh Annual Report

For the Fiscal Year Ending June 30, 1944

By W. B. KEMP, *Acting Director*

WITH activities of all agricultural agencies of the state directed toward successful prosecution of the war, the Station again has directed its full effort to that end. As in several years past, work has been held in abeyance on those projects which are not expected to make immediate contributions to food production, preservation or distribution.

The 57th Annual Report presents results for the fiscal year ending on June 30, 1944. It includes a brief summary of preliminary results from those studies that have not progressed far enough to justify publication in journal articles or bulletins. Publications appearing during this period include six bulletins of Series A, bearing numbers A26 to A31 inclusive; twelve miscellaneous publications numbered 18 to 29; twenty-seven contributions to scientific journals numbered A61 to A87; and one bulletin published jointly with the Extension Service on Maryland Farm Statistics. This bulletin presents a record of official statistics on yields per acre and volume of production from the earliest records to 1943.

Progress Reports On Research

FACTS ON THE ECONOMICS OF FARMING

FARM ORGANIZATION AND MANAGEMENT

Farm Income and Expenses—Detailed records kept for several years by a group of dairy farmers show that many of these farmers have operated their farms year after year efficiently and obtained a fairly large net income, while other farmers have not been so successful. Although individual farms vary widely in their physical and economic productivity and individual farmers vary in their managerial capacity, there are certain factors that are essential to successful operation of any farm. Some of these essentials are: Have a farm of sufficient size for the type of farming carried on to permit the use of labor-saving machinery and assure a large volume of business; obtain good yields from crops and livestock; keep production costs low; have a good balance between the investment in land, buildings, and machinery and equipment; and, keep debts to a minimum.

The 25 percent most profitable dairy farms from which records were obtained averaged 26 cows per farm; had 2.4 acres of pasture per cow; averaged 6,000 pounds of milk per cow; purchased $19 worth of dairy feed per cow annually; had a labor expense of only $14 per $100 of receipts; and had a labor income of $2,863 per farm. In contrast, the 25 percent least profitable farms averaged only 15 cows per farm; had 1.9 acres of pasture per cow; averaged 5,100 pounds of milk per cow; purchased $21 worth of dairy feed per cow; had a $29 labor expense per $100 of receipts; and had a labor income of only $409 per farm.

Trends in Maryland Agriculture—The agricultural pattern in Maryland has changed materially in the last 75 years, and even within the last two decades. Substantial decreases have occurred in numbers of horses, mules, and sheep, and in the acreages of corn, wheat, and oats. Upward trends are indicated in dairying, poultry production, and in the acreage of barley, soybeans, and vegetables for processing. Most of the other agricultural enterprises have remained fairly constant in acreage or production.

Cash farm income for Maryland farmers varied from a low of $43,265,000 in 1932 to a high of $155,055,000 in 1943. Net income per farm has increased from $669 in 1939 to $1,428 in 1942. Cash income from poultry and poultry products was $40,481,000 in 1943; cash income from dairy products in 1943 amounted to $32,984,000, excluding sales of dairy cattle and calves.

A bulletin entitled "Maryland Farm Statistics" presents data on the acreage, yield, production, and value of field crops from 1866 to 1943, and of truck crops from 1918 to 1943; numbers of livestock are shown for each year since 1867, and the production of livestock products since 1921; and prices received monthly for crops, livestock and livestock products are shown from 1908 to 1943.

Housing Conditions and Facilities for Farm Labor—A study of housing conditions and facilities, farm wages and perquisites was made to determine whether adequate housing facilities are available for farm laborers; to ascertain the condition of and facilities within available houses; to ascertain the cash wage paid and the kind and value of perquisites supplied farm laborers; and to obtain expressions from farmers as to their major labor problems.

One-fourth of farm laborers were housed in the farmers' own dwellings, and more than one-half were housed in other dwellings on farms. Half of the farmers' dwellings were in good condition, and less than 10 percent were in poor condition.

Monthly cash wages paid permanent workers in 1942 averaged $63, of which $20 was the value of perquisites supplied the laborers. Piece-work laborers earned $3.86 per day, compared with $3.18 for seasonal workers, and $2.52 for permanent month hands. Perquisites, in addition to cash wages, were supplied to 96 percent of the laborers hired by the month, 84 percent of those hired by the week, and 98 percent of the permanent day laborers.

Farmers hired an average of 1.4 permanent laborers per farm. About 77 percent of the farmers hired seasonal laborers.

Eighteen camps for seasonal farm laborers were operated in Maryland in 1943, as follows: 8 camps for Bahamian workers; 3 for colored boys; 4 for white boys; 1 for white girls; 1 for white women; and 1 as a labor depot. The total number housed in these camps at one time was about 3,000. The number of camps for seasonal workers in 1944 is more than double the number utilized in 1943. New features of the labor camps in 1944 are 9 mobile camps and 4 camps for domestic prisoners.

Bulletin No. A29 entitled "Wages and Housing Facilities for Farm Labor" was published during the year.

Farm Labor Requirements—The hours of labor required to produce each kind of crop and care for each class of livestock in Maryland were determined by detailed studies. It was shown that labor requirements vary widely, not only for different crops and different kinds of livestock, but also for the same kind of crops and livestock on different farms. Variations in labor requirements for the same enterprise between one farm and another are attributable to differences in size of farms, use of machinery, condition of machinery, quality of laborers, slope of the land, and condition of the soil.

On the basis of labor requirements, the number of workers needed to care for crops and livestock in Maryland was calculated for 1942, 1943, and 1944. The need was estimated to vary from a minimum of 38,000 to 43,000 in the winter months to a maximum of 80,000 to 87,000 in summer and fall months.

Detailed information on labor requirements is given in Bulletin No. A15, entitled "Labor Requirements for Selected Crops in Maryland" and in Miscellaneous Publication No. 15, entitled "Farm Labor Requirements in Maryland."

Feasible Agricultural Production in Wartime—Agricultural production is increased during wartime because of the greatly increased demand for food. Furthermore, it is to the interest of farmers, as well as the Nation as a whole, that every effort possible be made to increase the production of food and fiber.

Information is needed each year by state and federal authorities for the purpose of establishing production goals, in allocating machinery and supplies, and in determining labor requirements. To provide such information, research is conducted each year and a report is published on trends in agricultural production over the last several years and the expected or feasible production in the years of the immediate future.

Indications for 1944 and 1945 are for a continued expansion in dairying and production of eggs, with some reduction in numbers of hogs and beef cows, and a heavy curtailment in the numbers of broilers and feeder cattle. Production of feed grains and hay are expected to increase; however, the acreages of barley, oats, and soybeans will probably be reduced. Total acreages of truck crops are expected to show little change, but shifts away from vine crops to peas, snap beans and tomatoes are indicated. Major factors affecting production during the wartime period are expected to include: Reduction in both the quantity and quality of labor, insufficient machinery and containers, and a scarcity of livestock feed.

Maryland farmers do not expect to alter their present agricultural pattern materially during the post-war period. The soil, climate, transportation facilities and proximity to large cities give them a comparative advantage in the production of fluid milk, vegetables and poultry products. These will continue to be the leading agricultural enterprises, but the quantity of the various products will be governed to a large extent by market demands.

Factual material on the feasible agricultural production in Maryland during the war is contained in a mimeographed report entitled "Maryland Agriculture's War-Time Production Capacity," published in July, 1943.

Machinery Situation on Maryland Farms—Scarcity of farm labor makes machinery more necessary to farming in wartime, yet machinery manufacture is curtailed in order to produce war materials. Therefore, the allocation of new machinery and repair of old machinery during wartime are of vital concern to farmers.

More work can be performed by machines if farmers cooperate and use the same machines on several farms. This can be done by owning machines cooperatively, exchanging machines between farms, hiring machines to one another, forming machinery pools, exchanging labor for use of machinery, and by making greater use of custom-hire machines, such as pick-up balers and combines.

A study of the farm machinery situation in Maryland shows that 16 percent of the machines were classified as excellent in the fall of 1942; 36 percent, good; 33 percent, fair; and 15 percent, poor. Substantial numbers of machines in fair and poor condition can be made usable and more efficient by proper repair. Local repair facilities are available in most communities, there being 105 public farm machinery repair shops in operation in 1942-43. These commercial repair shops and public farm machinery repair schools are under the auspices of the State Department of Education. The 7,305 farmers enrolled completely repaired 5,764 machines.

Fifteen new machinery devices were found on Maryland farms.

Facts on the number, age and condition of each kind of machine on farms in Maryland are given in Bulletin No. A31, entitled "The War-Time Machinery Situation on Farms in Maryland."

FARM TAXATION AND FINANCE

Farm Income Tax Records and Reports—Farm income tax reporting cannot be simplified and clarified materially without certain changes in, and simplification of, the income tax laws. Various kinds of farm record keeping forms and income tax blanks were studied for the purpose of making improvements in the present farm income tax schedules. Many persons assisting farmers in preparing income tax reports were interviewed to learn of problems encountered in filling out farm income tax schedules.

A mimeographed report, entitled "Farm Income Tax Reporting Under the Federal Pay-As-You-Earn Tax," was prepared and distributed.

War and Post-War Tax Problems—Several types of public projects that will assist in the post-war adjustment period are of interest to farmers.

There will be need for county highway improvement, and surplus gasoline tax funds accruing to county accounts will be available for such work. Legislation restricts the use of county gasoline tax allotments to maintenance and certain road debt service, unless proposed road improvements meet the approval of the State Roads Commission. Most counties had accumulated a surplus in their tax accounts by July 1, 1943, which, with the anticipated gasoline tax revenue to counties of $1,863,000 during the present fiscal year, should be sufficient for maintaining the 12,000 miles of county roads.

Many courthouses are in need of improvement and repair. A number of local improvement projects, such as those in soil conservation and erosion control, forest conservation, and drainage, are likely post-war projects.

At the beginning of the fiscal year, July 1, 1943, Maryland had a general fund surplus of $12,600,000. Appropriations were made from this surplus by the 1943 General Assembly for post-war funds, war emergency and general emergency funds, teachers' and State employees' bonus, and salary adjustments. The unappropriated State General Fund surplus as of July 1, 1943, was nearly $$3,800,000, including a working fund of $2,000,000.

A report prepared for the Maryland State Grange and the Maryland Farm Bureau for the year 1943-44 contains information on the trend in State tax revenues, sources of State taxes, Federal income tax, Federal Sales taxes, Federal excise taxes, and post-war government projects of interest to rural people in Maryland.

FARM PRICES

Trends in Prices Received by Farmers—Farm prices in Maryland have risen 110 percent since 1939. The greatest increases have occurred in tobacco, fruits and truck crops. The price of dairy feed has advanced a little more than 70 percent since September, 1939, and farm wages have just about doubled. Farm real estate values have increased 36 percent since the beginning of World War II. Farms are being transferred at a more rapid rate than in the boom years of 1919-20. Real estate values are increasing at about the rate of 1.5 percent a month.

These are some of the facts set forth in Bulletin No. A18, entitled "War-Time Prices in Agriculture," and Bulletin No. A25, entitled "Trends in War-Time Farm Prices in Maryland." These bulletins give the trend in the general price level and the prices of farm products; the trend in cost of living; real estate values; a comparison of prices during the two World War periods; price ceilings and price supports and their influence on farm prices.

MARKETING FARM PRODUCTS

Transporting Farm Products and Supplies by Motor Truck—Efficient use of the motor equipment available has become a prime necessity in the war period. A general impression of the use that is being made of such equipment is obtained from records on about 2,500 motor vehicles transporting crops, livestock, and livestock products from farms to local markets. The records included length of haul, kind and volume of products, and type and age of vehicle.

Forty percent of the motor vehicles hauling strawberries to local markets, and 30 percent of those transporting milk to cooling plants were farm automobiles. About one-half of the motor vehicles used in transporting farm products were 8 years old and over, and 27 percent were 10 years old and over. Commercial-hire trucks averaged about one-half the age of farmer-owned motor vehicles. Transporting roughage on the farm accounted for 51 percent of the tonnage of farm products hauled on farms. Dairy products represented 37 percent of the tonnage transported from farms to markets.

Information regarding practices in delivering feeds and fertilizer and problems in the transportation of these supplies was obtained by interviews with about 175 feed dealers, 125 fertilizer dealers and 300 farmers. About one-half the fertilizer trucked from Baltimore plants went direct to farms. Local fertilizer dealers in Western Maryland delivered 70 percent of the fertilizer they sold, whereas Eastern Shore dealers delivered only 23 percent of their sales.

About 60 percent of the feed sold to farmers by dealers in Western Maryland, and 73 percent of that on the Eastern Shore, was delivered. Feed made up 41 percent of the total tonnage of supplies transported to farms.

Marketing Problems During the War and Post-War Periods—The war has accentuated the marketing problems of farmers, particularly in view of the fact that more food than ever before is being produced, while transportation facilities are less adequate. Information on transportation and marketing of specific farm products is being assembled with a view to determining how farmers and other haulers can economize in the use of tires and gasoline.

It was found, for example, that public service trucks hauling milk direct to Baltimore carried an average of nearly 5 tons of milk per trip during May, 1943. Local for-hire trucks hauled an average of 1.4 tons of milk per trip, and farm motor vehicles hauled 350 pounds daily per vehicle. Duplication, or overlapping, in assembling milk for cooling plants or direct shipment to Baltimore was most pronounced in the western portion of the milk shed.

Transportation charges for hauling milk from farms in Western Maryland to Baltimore varied from 15 cents to 35 cents per 100 pounds, with an average of about 29 cents.

A report, giving the results of the milk transportation survey, was prepared for the Baltimore Dairy Industry Transportation Committee.

The acute need for more adequate wholesale produce marketing facilities in Baltimore has been recognized for many years. Results of a detailed study of the situation, proposed plans for improvement and estimated costs have been issued and presented to the Governor's Commission on the Baltimore Wholesale Fruits and Vegetable Markets.

AGRICULTURAL ENGINEERING

Curing and Storing Sweet Potatoes—Information that points the way to decided reduction in the losses commonly experienced during curing and storage of sweet potatoes was obtained during the year. One sweet potato house was operated at 60 percent relative humidity and the other at 90 percent, or over, with like temperatures of 85° F. for curing and 55° F. for storing. Total losses of potatoes stored in crates in the high relative humidity house were only 77 percent as great as the losses of similar potatoes stored in the 60 percent relative humidity house. The house with lower relative humidity required 76 percent more heat than the house with higher relative humidity

Losses of potatoes stored in one-bushel baskets were only 62.9 percent as great as those of similar potatoes stored in slatted crates in the 60 percent relative humidity house.

That soil and management may be important factors in the inherent keeping quality of sweet potatoes is indicated by the fact that losses in one lot of potatoes grown in one part of the state were only 64.9 percent as great as those in similar stored potatoes from another section.

This work is being repeated and expanded to obtain information on year to year variations and additional data on the problems connected with this important crop.

Assistance was given in the design and construction of two large sweet potato storages in the state, one of 60,000 bushels and the other of 112,000 bushels capacity. Observations indicated that certain ventilating problems exist in these larger houses that do not appear in smaller units. Continued efforts will be made to find the answers to the problems of both large and small storage structures.

The importance of thorough insulation to make possible the holding of high relative humidity cannot be stressed too much.

FARM CROPS AND SOILS

Corn Hybrids Excel in Drought Tolerance—In the dry year of 1943 corn hybrids for the sixth consecutive year were at the top in all the tests. During that year four open-pollinated varieties and 123 hybrids were compared in replicated tests at one or more of four locations in Maryland. Yield differences in bushels per acre in favor of the leading hybrid over the leading open-pollinated variety were as follows: College Park, 15.4; Ridgely, 12.7; Spencerville, 12.1; and Hampstead, 7.9.

Hybrids showed the greatest superiority in the tests most seriously affected by drought. At College Park, where corn yields were only 40 percent of normal, established hybrids outyielded open-pollinated varieties of comparable season by 29 percent in 1943, as compared with 14 percent over a five-year period.

Although some hybrids are performing satisfactorily over a large part of Maryland, there is good reason to believe that even better results can be obtained through breeding of better hybrids and through more accurate placement of hybrids now available. Work is in progress with these aims in view.

Barley Varieties—Wong, a new winter variety, continues to give much promise for use in Central and Eastern Maryland. This variety has thick, compact heads with very short beards. The straw is stiff and comparatively tall. So far, this variety appears to be resistant to mildew and smut. In winter hardiness, it compares favorably with Marnobarb, a smooth-awned variety widely grown in the State. In a limited number of tests, yields of Wong have been good. Its performance has been more consistent than that of Sunrise, a variety of somewhat similar type that has been used successfully farther south. Further tests will determine whether Wong will be formally recommended for use in Maryland.

Rye Variety and Fertilizer Tests—Beginning in 1941, popular northern varieties of rye, such as Rosen and Imperial, have been compared with Abruzzi and Balbo, two widely grown southern varieties. The Rosen type is noted for the quality of its grain when grown under favorable conditions. On the other hand, Abruzzi and Balbo, with their small seeds and rapid early spring growth, are used widely for cover crop and forage crop purposes.

In local tests the latter varieties have out-yielded Rosen by 3.5 bushels per acre. Abruzzi and Balbo have not shown much difference in growth and productivity.

On land of low fertility, a 6-8-6 fertilizer mixture, with half of the nitrogen put on at planting time and the other half put on as a top-dressing in early spring, has given slightly better grain yields than the conventional grain mixture of 2-12-6, all put on at planting time.

Spring Top-Dressings of Nitrogen on Wheat—Highly profitable results from spring top-dressings of nitrogen on small grains continue to be shown on soils at the Plant Research Farm, where 2-12-6 fertilizer has been used at planting time and no manure is applied during the rotation. In one series of seven trials in the last four years, each pound of nitrogen applied in the first week of April has added an average of 25.1 pounds of grain and 49.5 pounds of straw to the crop. In these tests, 16 pounds of nitrogen per acre has been applied in the form of nitrate of soda on wheat which averaged 25 bushels of grain and 2,040 pounds of straw per acre without top-dressing.

Lespedeza Turned Under for Wheat Following Wheat—A green manure crop of Korean lespedeza planted in the spring in wheat and turned under in late August added 6.7 bushels per acre to grain yields and 792 pounds to the straw as an average for 12 plantings extending over a three-year period. The average yields without legume in these tests were 21.6 bushels of grain and 1,807 pounds of straw.

Cover Crops in Corn—Rye and vetch have proved more successful as a cover crop in corn than any other crop tested during a four-year period at the Plant Research Farm. When planted at the time of the last cultivation, rye advanced so far that much died during winter, but the vetch survived. When planted after corn harvest, the rye makes a dense stand, but very little vetch survives. Both ryegrass and crimson clover, either alone or in combinations, are less dependable than rye and vetch. Cowpeas usually produce a good stand, but the dead plants tend to disappear before spring and the spring planted crop which follows seems to derive little benefit.

Effect of Potash Soil Treatments on Hay Yields—Yields of hay from alfalfa and similar crops could be materially increased in Maryland by the use of more potash, it appears from results of tests and observations.

On Glenelg loam soil in the Piedmont area, 100 pounds of potash were applied to a second-year growth of alfalfa which had received 400 pounds of 0-14-7 at seeding time. During the last two years, this one treatment of potash has increased alfalfa yields by 1½ tons of alfalfa each year, and the quality of hay was superior on the potash plots.

Effect of Boron Soil Treatments on Hay Yields—Forty pounds per acre of borax applied with potash to a second-year growth of alfalfa on Glenelg loam soil gave an average increase of one-ton of hay each year for two years. The quality of hay on the boron treated plots was much superior. Boron treated alfalfa plants showed little yellowing or deficiency symptoms, while plants on plots without borax showed considerable yellowing.

Results and observations indicate that use of boron should be quite profitable for production of alfalfa and similar crops in Maryland. Where lime and potash have been used liberally, boron should be used also for highest yields and best quality hay.

Different Forms of Lime—Returns from each form of lime were about in proportion to its cost delivered in a test of different lime carriers on a very poor and very acid Beltsville loam soil, started in 1942. Ground limestone, fine slag lime, coarse slag lime, hydrated lime, and burnt lime were tested on soybeans and wheat. Even the slag lime, a by-product of steel furnaces, should be a suitable form of lime because of its low cost.

Phosphorus Carriers—A comparison of phosphorus carriers in commercial fertilizers on a Beltsville loam at the University farm indicates that super-phosphate, the form of phosphorus normally used in this State, is one of the most satisfactory forms. Fused rock phosphate developed by the TVA seems to be quite promising. Raw rock phosphate, even with a heavy rate of application, has given results that are unsatisfactory.

The tests were made in a two-year rotation of corn and wheat with lespedeza and sweet clover in the wheat for a cover crop. For each crop, 20 pounds of nitrogen, 50 pounds of phosphorus, and 30 pounds of potash were applied. Four times the standard application of raw rock phosphate, or 200 pounds for each crop, was applied to one series of plots.

FEEDING AND BREEDING LIVESTOCK

Fattening Rations for Steer Calves—The best possible use of the feed available for livestock has been of vital importance under conditions brought about by the war. Efforts were continued to obtain practical information regarding the efficiency of various combinations of feeds which could be used by Maryland stockmen, with a view to helping them make the most from their livestock enterprises.

Four comparable lots of Hereford steer calves, 10 calves to a lot, were put on full feed in dry lot and fed for a period of 253 days during the winter of 1942-43 and spring of 1943. Hogs followed the steers.

The ration fed Lot 1 was shelled corn, soybean oil meal, corn silage and mixed legume hay; Lot 2 was given shelled corn and crushed barley in the ratio of 1:1, soybean oil meal, corn silage and mixed legume hay; Lot 3 was fed shelled corn and crushed wheat in the ratio of 1:1, soybean oil meal, corn silage and mixed legume hay; Lot 4 received shelled corn, crushed barley and crushed wheat in the ratio of 1:1:1, soybean oil meal, corn silage and mixed legume hay.

All rations were supplemented with ground limestone and salt.

There was no significant difference in the daily rate of gain made by the several lots, the rate being approximately 1.8 pounds.

The pork credit per steer ranged from 181 pounds for Lot 3 to 169 pounds for Lot 1, the Lots 2 and 4 being intermediate.

Steers fed the mixtures of corn and barley and corn and wheat, respectively, were somewhat better finished and more uniformly finished than the steers fed shelled corn. The grain mixture of corn, barley and wheat, equal parts, produced significantly poorer finished steers.

A fifth lot of steers was wintered on approximately 5 pounds of grain and supplement, 5 pounds of hay, plus corn stover. They were grained on pasture and finished in dry lot. Use of pasture effected a saving of 58 pounds of grain and supplement per 100 pounds gain. The dry pasture season of 1943 probably resulted in less feed saving than would be obtained in a season of average rainfall.

Corn Silage Compared With U. S. No. 2 Clover and Light Timothy Hay for Pregnant Beef Cows—Results obtained thus far indicate that pregnant cows can be fed satisfactorily a roughage ration of corn silage alone, when the ration is supplemented with small amounts of protein and calcium. Also, that such a feeding practice is desirable from the standpoint of economy.

The first phase of this experiment began December 23, 1943, and terminated May 12, 1944.

Lot 1 cows were fed a ration of clover, light timothy hay and a mineral mixture of 50 percent salt, 25 percent ground limestone and 25 percent steamed bone meal during the dry period. Approximately 23 pounds of hay was fed daily. Minerals were fed free choice. After calving, the nursing cows and their calves were turned into a separate lot and continued on hay and minerals. In addition, the cows were fed 4 pounds of crushed barley and 2 pounds of corn gluten feed daily per cow during the remainder of the test.

Lot 2 cows were fed a ration of approximately 50 pounds of corn silage daily, supplemented with sufficient soybean oil meal (.82 pound daily per cow) and ground limestone (.1 pound daily per cow) to make up for the deficiencies of the ration in protein and calcium, together with the mineral mixture fed free choice. After calving, the cows and their calves were continued on silage, soybean oil meal, lime and minerals and were fed in addition 4 pounds of crushed barley and 2 pounds of corn gluten feed daily per cow.

The calves in both lots were creep-fed a grain-alfalfa hay mixture during the first part of the test and a grain mixture the last part of the test.

Although the two lots were very comparable as to weight, condition, vigor and age when the test began, the silage fed cows were far ahead in weight, condition and vigor at its conclusion. Their calves were approximately 10 percent heavier at birth and gained more rapidly.

Wintering Rations for Pregnant Ewes—Further light on the use of silage in the rations for wintering ewes was obtained from the third trial of a three-year experiment. Considering the effect of the ration on both ewes and lambs born, preliminary analysis of the results favors a roughage ration composed of medium amounts of both hay and silage.

Three lots of ewes on test from November 23, 1943, to April 26, 1944, were fed daily rations as follows: Lot 1 received 3.5 pounds of corn silage, .87 pound of U. S. No. 2 clover and light timothy mixed hay; Lot 2 was given 1.75 pounds corn silage, 1.75 pounds of the same kind of hay as Lot 1; and, Lot 3 was fed 2.63 pounds of the hay.

Shelled corn and soybean oil meal were fed in addition to the roughage feeds to equalize the amount of digestible protein and total digestible nutrients in the three lots.

As was found in last year's trial, the lambs born in the lot fed no silage were heavier at birth than those born to ewes receiving silage. They appeared considerably stronger and more vigorous at birth, as indicated by a noticeably higher survival percentage.

Ewes fed on a heavy silage ration increased in weight during the entire period of pregnancy and lactating ewes in the medium silage lot (3) maintained their weight, whereas those fed hay only as roughage (1) lost weight.

Swine Breeding—A further step was made during the year in the breeding procedure, which has for its ultimate object the development of a black race of swine carrying approximately 13/16 Danish Landrace and 3/16 Berkshire blood and possessing the most desirable qualities of both parent breeds. Purebred

Landrace boars were mated to ¾ Berkshire, ¼ Landrace sows to obtain ⅝ Landrace, ⅜ Berkshire crosses. Individuals carrying these percentages of blood were selected and will be intermated to produce the next generation. One more infusion of Landrace blood will be made, after which intercross matings will be made exclusively.

The work is conducted jointly with the Bureau of Animal Industry of the U. S. Department of Agriculture.

PLANTS AND THEIR DISEASES

Potatoes—An extremely promising seedling potato, formerly known as Seedling B247, was named as the Potomac variety during the year. This seedling yielded 638 bushels per acre of U. S. No. 1 potatoes, which was the largest yield obtained from the late varieties.

For many years, a great number of unnamed potato varieties have been tested and compared with the standard varieties in an effort to obtain varieties that can be grown more profitably than those used by many growers.

That spraying pays is shown by a comparison of yields from sprayed and unsprayed plots, although Potomac yielded 198 bushels per acre of U. S. No. 1 potatoes even when it was not sprayed, and few tubers had late blight. It has consistently shown resistance to late blight and to injury from flea beetles.

Strawberries—Introduction of the red stele resistant strawberry named Temple is proceeding rapidly and approximately 50,000 plants were made available the past year.

Other unnamed varieties, apparently just as resistant as Temple, are being tested on infested soil, multiplied for production trials, and used in further crosses. Many new selections from Oregon and Illinois are being compared with selections in this state.

Seed Treatments—Conservation of seed supplies and the labor cost of replanting have attracted greater attention to the possibility of eliminating many seed and soil diseases by seed treatments. Such treatments are usually effective because they increase the stand of plants.

With most mercury and copper compounds scarce, a whole series of new compounds are making their appearance and are being tested on peas, lima beans, soybeans, sweet corn, and other crops. The two crops that have shown most promising results are sweet corn and soybeans.

Sweet Potato Discoloration—A basis for working out a practical method for preventing discoloration of sweet potatoes during preparation for dehydration has been established by a critical study during the past year. It was found that the heat of the lye peeling process was primarily the cause of the trouble and by a preheating, which destroys the enzyme activity, this serious discoloration can be eliminated.

Twin Seedlings of Pepper—Hundreds of twin seedlings of pepper were made available some two years ago and eight plants were finally discovered to be haploids. This type of plant in itself is of no use, but by chemical treatments it can be brought back to normal and the resulting plant is a pure breeding type. The variation of pepper varieties has always been a problem, and thus a method of getting such pure breeding types has been worked out. These lines may be of use in themselves, but more likely they will furnish future breeding stock. Pure lines have been established in both King of North and World Beater, and California Wonder twin seedlings are being observed.

DAIRY CATTLE AND DAIRY PRODUCTS

Feeding Value of Cheat for Dairy Cows—Cheat, as it is commonly grown on many farms, is regarded as a weed; yet chemical analyses show the cheat grain is similar in composition to barley and oats. Field tests show that it will outyield oats and under many conditions will outyield barley. Results obtained in two feeding trials with dairy cows show cheat to be equal to barley in feeding value for milk production.

In these tests, cheat was compared with ground barley when fed as 30 percent of a grain ration for milking cows. In the first trial, the cows on the cheat mixture averaged 30.1 pounds daily of 4 percent fat-corrected milk, and the cows on the check, or barley, ration averaged 29.6 pounds daily. In the second trial, when the milk produced by each group was equated to its equivalent value in 4 percent fat-corrected milk, the cows on cheat mixture averaged 27.4 pounds of milk and those on the barley ration averaged 28.1 pounds of milk daily.

Yield tests, chemical analyses, and feeding tests indicate that cheat has excellent possibilities as a feed crop for farmers to grow.

Dry Starters for Dairy Calves—Present demands for milk make it imperative for dairymen to use a minimum of whole milk in raising their calves. A method has been devised whereby a limited amount of whole milk is used with a dry calf starter.

Various calf meals and starters have been used successfully, but the most satisfactory ones contain dried skimmilk and cod-liver oil, which wartime has made almost prohibitive for animal feeding. Therefore, it appeared necessary to develop for farmers and commercial feed manufacturers satisfactory dry starters using ingredients that were available and omitting dried skimmilk and cod-liver oil.

A new dry calf starter was compounded containing dried whey and alfalfa leaf meal to replace the dried skimmilk and cod-liver oil. Another mixture containing the same ingredients was used with certain of the ingredients pelleted to give a combination of meal and pellets. The object of this mixture was to determine the effect on palatability of pelleting part of the ingredients. These mixtures were fed to three groups of 14 calves each to 16 weeks of age.

From results obtained in this feeding trial, it appears that dried whey and alfalfa leaf meal were very satisfactory to replace dried skimmilk and cod-liver oil in wartime dry calf starters. Pelleting a part of the mixture did not appear to increase palatability of the mixture, as judged by consumption of the starter.

The findings from this work have already been applied. Several feed companies are now mixing and selling starters using ingredients that are now available and omitting dried skimmilk and cod-liver oil.

Vitamin A and Carotene Requirements of Dairy Calves—Requirements of calves of all ages and conditions for carotene or vitamin A are not known. This is important in feeding calves in order to know how much carotene calf starters and hay should contain in order to produce healthy calves.

Results of working during the past year indicate that requirements for the summer months are approximately half of that required for winter months. Attempts are being made to establish the reason for the difference between carotene requirements for summer and winter. During the past winter, calves were kept in a thermostatically controlled, heated room at a temperature of about 80° F. A similar group of calves was kept in the dairy barn at winter temperatures. Since there was no difference between the two groups of calves, it is indicated that temperature may not be the factor concerned in the difference between summer and winter requirements.

Effect of Vitamin A on Milk Production—Commercial products have been placed on the market during the last few years which supposedly stimulate milk production. Preliminary results on feeding one commercial product, which consists essentially of a combination of starches, vegetable oils and vitamins A and D from fish liver oils, indicate about a 10 percent increase in milk production where the product was fed to cows receiving a grain ration, silage, clover and timothy hay. Whether the increase in production was due to vitamin A or to some other constituent in the ration has not been determined. The reason for such a large increase in milk production might be of considerable practical importance and appears worthy of further investigation.

Effect of Storage Conditions on the Vitamin Content of Whole Milk Powder—In view of the large quantities of spray dried whole milk powder being used abroad by our armed forces and for Lease-Lend, a knowledge of how to store this product so that the vitamins may remain intact for utilization by the ultimate consumer is of greatest importance. Economically, proper handling to maintain the highest possible vitamin content would not require as great use of commercially prepared vitamins to maintain health.

An effort was made to determine the effect of temperature in storage and length of time of storage on the vitamin A, carotene and riboflavin content of spray dried whole milk powder.

Results of analyses showed considerable decrease in vitamin A and carotene during the storage period. The average decrease in vitamin A after storage for 12 months at 20° C. was 22.63 percent; at 30° C., 24.83 percent; and at 37° C., 50.23 percent. The average decrease in carotene after storage for 12 months at 20° C. was 19.69 percent; at 30° C., 34.30 percent; and at 37° C., 36.50 percent. The most rapid decrease took place between the ninth and twelfth month. There was no decrease in riboflavin at any temperature studied during the 12 months.

It may be concluded that for greatest conservation of vitamin A and carotene in spray dried whole milk powder, the product should be stored at temperatures not in excess of 20° C., and should be consumed within three months after being stored.

INFLUENCE OF BACTERIA ON FARM PRODUCTS

Effects on Fruits and Vegetables During Dehydration and Storage—It was found that, in general, sulphuring of fresh apples reduced the microbial population by 90 percent. During dehydration, the remaining 10 percent was reduced to 5 percent. Original counts, as would be expected, were very low, only 350 yeasts and molds and 2,000 bacteria per gram. Naturally, there was no increase in numbers during preparation and drying.

In a second test, samples of four varieties of apples were collected after drying was completed. All samples contained less than 500 microorganisms per gram, and cannot be said to indicate any microbial activity.

The initial contamination (from the rinsing operations) of 1,500 per gram of peas was reduced by the steam blanch to 5 per gram. The number did not increase sufficiently at subsequent stages of drying to indicate any bacterial growth.

Effects on Dressed Poultry—That drawing and eviscerating of poultry results in greater internal contamination than when the birds are simply dressed, i. e., not opened nor drawn, was indicated by studies of birds dressed by the three methods. Consequently, greater microbial action and greater spoilage occurred in birds that had been drawn or eviscerated. This spoilage appeared confined to the surface areas within the body cavity, and did not extend deep into muscle tissue.

DISEASES OF ANIMALS AND POULTRY

Infectious Mastitis—Treatment of cows with infectious mastitis indicates that the efficiency of several drugs is sufficiently high to justify herd treatment.

Unless a thorough follow-up of the results of treatment is put into effect, together with sanitary practices in handling the herd, reinfection takes place and within a period of time the disease will have spread again to alarming proportions. Most of the failures are not due to inefficiency of the treatments, but to failure of the follow-up control procedure.

Rabies—This disease has been present in two counties of Maryland adjacent to the District of Columbia for more than a year. Quarantines imposed by the State Board of Agriculture and enforced by local officers and agencies did not prove adequate, although the efficiency was in proportion to the enforcement of the restrictions.

Some 11,000 dogs in each county were vaccinated, which in one county was 90 percent of the dog population and in the other county only about 75 percent. No ill effects followed vaccination. The period since completion of the treatment has not been long enough to warrant drawing definite conclusions as to the effectiveness of this method for control of rabies.

Bovine Trichomoniasis—Spread of this disease from herd to herd seems to have been slowed by the dissemination of information regarding the methods of spread. Proper herd management where the disease has been found is of benefit in controlling infection in these herds.

Studies on diagnosis, treatment, and control of this disease of the genital tract have been hampered by difficulties of transportation and lack of personnel.

CONTROL OF INSECT PESTS

Japanese Beetle—Due to war demands, the cost of the standard Japanese beetle bait soared beyond the limits which made its use practicable. It was found by extensive tests with diluents having the same evaporating rate as the standard bait that a mixture of the standard bait at the rate of 60 parts to 40 parts of diluent caught an equal or larger number of beetles. In this way, the cost of bait for Japanese beetle traps was brought down to an economical basis.

European Corn Borer—Applications of rotenone and pyrethrum to canning corn did not result in significant reductions in the infestation. Since the use of parasites has proved an effective means for control of certain other insects, a cooperative arrangement was entered into with the U. S. Bureau of Entomology and Plant Quarantine for rearing and disseminating parasites of the European corn borer. Approximately 60,000 parasites of four species were liberated in the spring of 1944.

Tobacco Hornworm—In order to determine the abundance of tobacco hornworm at various periods during the season, a new type of hornworm trap is being operated in five counties in Southern Maryland. It was found, for example, that the early brood in 1943 was very light but the second brood was extremely abundant in Calvert county, with lesser abundance in the other tobacco growing counties. The traps give a good index of the seasonal occurrence and possible use of a series of traps in any one field might serve as a control measure.

Concentrated Sprays—In addition to application of sprays at the rate of 6 to 10 gallons per acre for control of pea aphid and Mexican bean beetle, efforts were made to develop efficient machinery for application of concentrated sprays. Such equipment was used in the spring of 1944 with excellent results.

Field tests of aerosols, particularly with DDT and rotenone on peas in the spring of 1944 gave excellent preliminary results.

Migratory Beekeeping—Promise of greater honey production and better pollenization of canning beans was indicated by results of moving honey bees to different areas during the season. Bees were moved from the area around College Park to the mountain valleys of Allegany county and after the honey crop was gathered there, to a buckwheat location in Garrett county. Some of the bees were moved later to the Eastern Shore for pollenization of canning lima beans. These tests should give data on the amount of surplus honey that may be expected from that source.

FRUITS AND VEGETABLES

A New Peach to Replace Elberta—The new Redskin peach of the Elberta season, named and introduced in January, 1944, already has received wide attention from growers, nurserymen, and research workers in the United States and Canada. Many nurserymen applied for bud wood in quantity this season and trees were planted in test orchards at agricultural experiment stations in Pennsylvania, New Jersey, Virginia, South Carolina, Georgia, Ohio, Indiana, Michigan, Oregon and Washington.

This immediate interest may be ascribed to the many excellent qualities of the Redskin peach, and especially to the fact that these qualities have been verified by a long period of testing under commercial conditions in Maryland. Again in 1944, trees in orchard plantings produced high yields of high-colored, large-sized fruits and maintained excellent growth in spite of heavy crops; in fact, the large size and spreading habit of bearing trees of Redskin makes imperative a wide distance of planting, such as 26 ft. by 26 ft.

Resulting from the crossing of J. H. Hale by Elberta, this new yellow free-stone peach that ripens slightly ahead of and during the Elberta season, has been tested and fruited in several parts of Maryland during the last 14 years. Its commercial value for this state is now apparent. It was described as promising in the Station report of 1941-42, and an accompanying picture illustrated the size and shape of the fruit.

The fruit of Redskin is round, or nearly so; yellow-fleshed with little or no red extending from the pit; completely freestone; very firm fleshed with excellent shipping and keeping qualities; and well colored with a deep red blush even under shaded conditions. Fruits develop good size, even with a heavy load of fruit, and high yields have been obtained. Its edible, canning, and freezing qualities have been rated high.

The tree of this variety is vigorous and spreading in habit and the buds survived the low winter temperatures of 1942-43 along with the hardier varieties. Blossoms are large and showy (Fig. 1), with a light pink color, and open about the same time as Elberta. Leaves are broad and flat, with a lighter green color than Elberta.

Abnormal Growth and Fruiting Behavior of Peach Trees—That certain practices in relation to soil conservation techniques are highly undesirable, if peach tree losses are to be avoided, is indicated by several years of study and observation.

In establishing new peach orchards, observance of the following points is especially pertinent:

1. In planting on terraces the trees should not be set first and the terraces constructed afterward by throwing up furrows against the trees. High tree mortality can be expected in subsequent wet seasons, especially where a heavy or tight subsoil prevails. Also, gas penetration sufficient to give good borer control is impossible.

2. Terraces should be built in time to allow for settling before trees are planted.

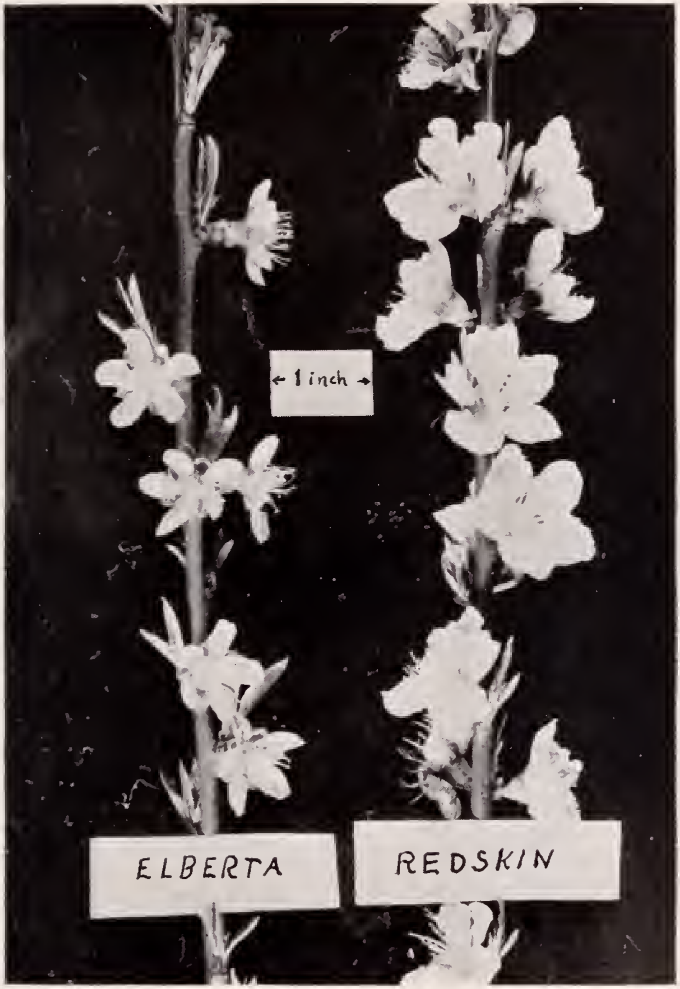

FIG. 1. *Blossoms of the new Redskin peach, named and introduced by the Maryland Station in January, 1944, are large, showy, and pink colored, in contrast to the small blossoms of Elberta. Redskin is a prolific producer of blossom buds that were found to be hardier "in the bud" than Elberta during the winter temperatures of 1942-1943.*

3. Terraces must be high enough so as not to require additional soil against the trees at a later time.

4. Unless there is excellent underdrainage, it is essential that sufficient slope be allowed to take off excess water from above the terrace within a reasonable time. Standing water above terraces, especially during fall, winter, or early spring, has resulted in death of trees from suffocation (Fig. 2).

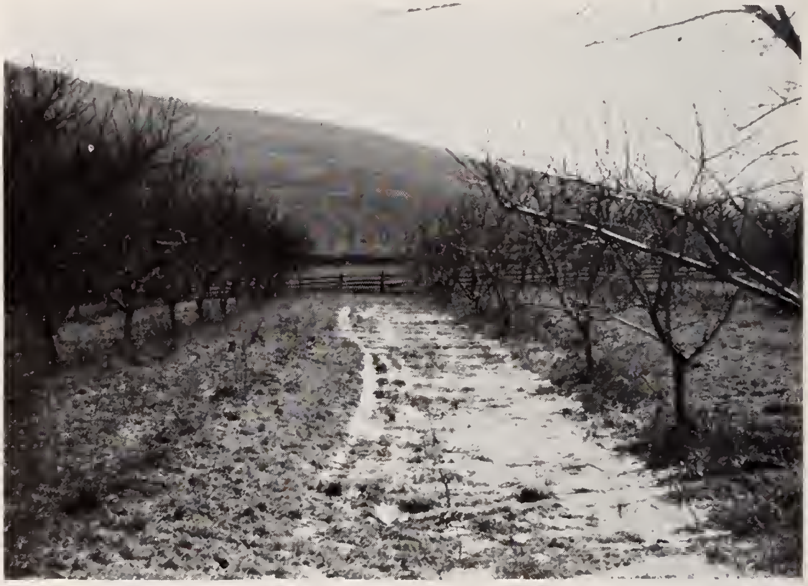

FIG. 2. *Standing water in the peach orchard has a lethal effect on trees. In the above picture, water is being held during winter because of faulty terrace construction which does not allow enough slope for run-off of surplus water. Unless there is exceptional under-drainage, death of trees results because of smothering. Tree losses may be expected on any orchard site where drainage is poor.*

5. When terraces on relatively shallow soils are constructed only for every other row, requiring that some top soil be taken from between to form the terrace, the trees set in the interadjacent rows can be expected to make poorer growth, with losses in dry seasons.

6. Setting more than 75 peach trees per acre should be avoided.

Varieties of Maryland Apples for Dehydration—Since York Imperial, Rome Beauty and Stayman Winesap appear to be the leading apple varieties of this region for dehydration, further studies were made as to the procedure in drying these varieties.

It was found with a two-stage tunnel drier of pilot size that a temperature of 210° F. in the primary tunnel, together with high air velocity (1,200 ft. per minute) and low humidity (100°-105° wet bulb) gave the most rapid drying resulting in a satisfactory product. Use of a 30-second steam blanch of the prepared raw stock, following sulfuring, also markedly decreased the drying time.

From moisture studies of the product during the drying at various temperatures, it appears that determination of the moisture content at the end of the primary stage of drying affords a key to the time necessary for the first period of the drying operation. A product of relatively low moisture content (4.5%) was obtained with two hours in the primary tunnel at 210° F., followed by three hours in the finishing stage at 165° F. Fifteen minutes more in each stage reduced the moisture content to 3.09%.

Commercial application of these results in production of a low moisture product with the tunnel drier could become important in relation to the storage or shelf life of dried apple sections. Investigations have shown that low moisture content is one of the big factors contributing to the lengthening of storage life and retention of color, and the other important factor is high sulfur content. At 100° F. storage, the low moisture, high sulfur lots of dried product showed no appreciable color change after 150 days.

Comparison of Porto Rico and Maryland Golden Sweet Potatoes for Dehydration—There has been much controversy over the relative merits of Porto Rico and Maryland Golden varieties for dehydration. The results of analyses given in

Conversion of 100 Pounds of Dehydrated Maryland Golden and Porto Rico Sweet Potatoes, Grown and Stored Under the Same Conditions, to Rehydrated Weight and Nutritive Values.

(Dehydrated after Curing)

	Maryland Golden	Porto Rico	Increase for Maryland Golden over Porto Rico
	Lbs.	Lbs.	Percent
Reconstructed weight— 100 lbs. dry material	569.0	420.0	+ 35.5
Protein	11.16	6.78	+ 64.7
Fat	1.12	0.45	+148.9
Carbohydrate	73.51	81.27	— 9.0
Calcium	0.102	0.062	+ 64.5
Phosphorus	0.186	0.120	+ 71.7
Carotene	0.0373	0.0165	+126.0

the preceding table prove beyond doubt the superior nutritive value of Maryland Golden in comparison with Porto Rico grown under the same conditions and where the same amount of dehydrated potatoes of each variety is reconstituted.

Dehydration of Sweet Corn—In general, sweet corn for dehydration should be harvested at least one day earlier than corn for canning. The flavor and texture of dried sweet corn which is cut from the cob and blanched in steam for 5 or 6 minutes is superior to that blanched on the cob by either steam or hot water. Prolonged blanching on the cob for 15 to 20 minutes, which has been recommended, causes a flat, "cobby" flavor and a poor color in the dried product.

These are some of the results obtained from detailed studies of factors influencing the quality of dehydrated sweet corn which have been made during the last two years.

The most satisfactory drying temperatures were found to be 170° F. for two and one-half hours with an air velocity of 1,200 linear feet of air per minute, and four to five hours at a finishing temperature of 155° F. with an air velocity of 200 feet of air per minute. Under these conditions the moisture content of good quality corn will be about 6 percent. Prolonged drying and lower moisture contents produce an inferior quality product.

Canning Sweet Potatoes—Lots of Maryland Golden and Porto Rico sweet potatoes were taken from storage and canned by the following methods:

1. Syrup pack, using whole potatoes canned in 20 percent sugar syrup.
2. Vacuum pack, using whole potatoes.
3. Solid pack, where the potatoes were steamed until soft and packed solidly in cans while hot. The cans of solid pack were further divided into two lots, one of which was processed in boiling water and the other under pressure.

Enough material has been assembled to make some interesting comparisons as to the effect of storage on the nutritive value of sweet potatoes, and also the comparative desirability of the several methods of canning.

It is planned to have analyses made of samples of these lots of canned material and to have them graded by a panel of canners and research workers in this field.

Tomato Varieties—Twenty-five varieties and selections of tomatoes were grown in 1943, most of which were new selections, with a few standard varieties for comparison.

The only two varieties developed since the introduction of Rutgers which are of general interest for the canning acreage in this area are Pan America and Garden State. In a recent test, Rutgers produced 27 percent more marketable tomatoes than Pan America. The latter variety, however, is highly resistant to Fusarium Wilt and might well be used in some isolated areas where this disease is a limiting factor in production. Its use is recommended also in many home gardens where wilt infestation is extremely high. Garden State, a new variety, seems to yield about the same as or slightly higher than Rutgers. At College Park, it was slightly later than Rutgers. The foliage tends to stay bunched throughout the season, shading the fruit somewhat better than Rutgers late in the season. For the same reason, however, it is harder to pick early in the season. It is a promising variety, but will be tested further before definite recommendations are made.

Several Maryland Experiment Station selections from a cross of Brown's Special and Marglobe, back-crossed on Pan America, give promise of wilt resistance, a minimum of cracking, and fair vine and fruit type.

Vegetable Soybeans—Eight varieties were grown at Ridgely, with three planting dates of May 21, June 12, and July 1. A severe drought during the entire growing season greatly reduced yields and many of the beans turned yellow in the pods before they had reached the maximum size for a given variety. The varieties grown were Giant Green, Bansei, Toku, Emperor, Willomi, Hokkaido, Aoda, and Mendota.

Canners, growers, food technologists, and others interested in this crop for canning critically judged samples of each variety that had been canned. Factors considered in the scoring were color, clearness of liquor, flavor, and maturity. Nineteen score cards were turned in. The variety Emperor scored highest and Mendota lowest. It is significant that in four years of work with this crop, during which time 12 varieties have been grown, Emperor has each time scored highest.

From the standpoint of yield, quality of canned product, and length of growing season, results for the four years show that for the varieties grown Emperor, Bansei, and Willomi are best adapted to Maryland conditions.

Lima Bean Varieties and Dates of Planting—Seven canning varieties or strains of lima beans were planted at the Ridgely Substation on four dates. Included in the trials were two strains of Henderson Bush, three green-seeded types, Maryland Thick Seeded, Early Baby Potato, and Baby Fordhook. A fourth green-seeded strain and U. S. D. A. No. 443 were added in the

FIG. 3. *Lima bean and soybean canners, food technologists, and experiment station workers evaluating canned samples of new types of lima beans and edible soybeans. Tests of varieties for processing are a part of the horticultural work of the Station. All tests are made under conditions approaching those of commercial processors.*

third planting. The planting dates were May 28, June 8, June 18, and July 1.

Due to excessive drought during the late summer, the third and fourth plantings made very low yields.

There were no significant differences between yields of the Henderson strains, the green-seeded types, and Baby Fordhook. Only one variety, Clark's Bush, significantly outyielded Early Baby Potato. All of the above yielded higher than Maryland Thick Seeded. The U. S. D. A. selection, No. 443, included in the third planting only, yielded exceptionally well, and the canned product scored higher than any other variety, but it was so late in maturity that it would not be suitable for the canning acreage following peas. It required 111 days from planting to harvest, as compared with 76 and 77 days for the Henderson strains.

The variety yields are fairly well in agreement with those of previous years, except that Baby Fordhook yielded better in comparison with Baby Potato than has generally been true in the past.

POULTRY

Dehydrated Pea Vines in Poultry Diets—Dehydrated pea vines were found superior to a good quality dehydrated alfalfa meal as a supplement to a starting and growing mash containing soybean oil meal as the sole protein supplement. Their superiority appeared to be due to greater palatability. Starfish meal was as effective as commercial menhaden meal in supplementing such a mash. The amino acid, methionine, supplemented such a mash as effectively as fish meal. Choline and nicotinic acid were not effective supplements. They appeared to be supplied adequately by the ingredients of the mash, which contained yellow corn, oats, bran, middlings, alfalfa meal, mineral supplements, a fermentation by-product, and vitamin A and D oil in addition to soybean oil meal. These results indicate the possibility of using available by-products in poultry feeds.

Effects of Heating Soybeans on Nutritive Value—Moisture content and acidity at time of heating can apparently be eliminated from the list of possible causes for variability observed among commercial soybean oil meals, according to results of tests conducted at this Station.

When extracted soybean oil meal was autoclaved 2½ minutes at 15 lbs. pressure, the effectiveness of the heat treatment in improving nutritive value for chicks was not influenced by moisture content within the range of 2% to 15% moisture, nor by acidity within the pH range 4.9 to 6.5. There was less improvement due to autoclaving if the meal was previously dried to a moisture content of less than 2%. Sprouted soybeans were little if any better than unsprouted raw beans when fed to chicks as sole protein supplement.

Effects of Environmental Conditions on Hatchability—Several million chicken hatching eggs are brought into Maryland by truck each year, mostly from New England. Hatchability of numerous shipments is apparently affected by environmental conditions, especially at times of low temperatures. Efforts were made to determine the effects of low temperaturs on hatchability.

Hatchability of eggs produced by New Hampshire pullets mated to cockerels was not influenced noticeably by environmental temperatures ranging from 14° F. to 73° F. When these eggs were stored from one to seven days at temperatures of 32° F., 38° F., and 52° F., respectively, there was no relationship between storage temperature and hatchability.

It was found also that neither specific gravity nor shell appearance of fertile turkey eggs was related to hatchability.

Shipping Hatching Eggs by Air Cargo Planes—Two tests were conducted to determine the effects on hatchability of shipping eggs by airplane. One shipment was made from Washington, D. C., to Los Angeles and return, and another shipment from Washington, D. C., to Miami and return, via New York each way. The eggs were selected and incubated at the University Poultry Department, the "control" eggs being selected from the same flocks and at the same time as the eggs to be shipped. The air-shipped eggs and "control" eggs were set in the same incubator at the same time. The following table gives the results:

Distance traveled, miles	5,200	....	2,500	....
Highest altitude, feet	12,000	....	7,000	....
Range in temperature	48°-70° F.	....	34°-80° F.	....
Number of eggs	180	180	180	180
Number infertile	3	3	4	3
Number dead embryos	20	15	18	17
Number chicks	157	162	158	160
Percent hatchability	88.7	91.5	89.8	90.4

Effect of Chilling on Manifestation of Resistance to Pullorum Disease—Day-old chicks of the Maryland resistant strain of R. I. Reds were divided upon a family basis and one group was chilled for 5 hours at 60° F., and the other was unchilled as a control. Both lots were administered standard suspensions of live B. Pullorum.

There was no difference in mortality in the two lots. This suggests that the resistance developed in the Maryland R. I. Reds by selective breeding and progeny testing is specific, and not general; also, that controlled chilling as a brooding hazard has no effect upon mortality. While this result seems to be at variance with statements issued at other stations, it is felt that heretofore proper distinction has not been made between *chilling* and *low brooding* temperature.

Role of Wheat in Pullet Disease—That wheat may be concerned with the incidence of pullet disease is indicated by the fact that the trouble appeared in all three pens of chickens fed wheat and none in the control pens fed corn. Careful observations reveal that wheat either is concerned with the appearance of pullet disease, or that it is the victim of chance. Limited additional field observations failed to reveal cases of typical pullet disease where wheat in substantial quantities was not being fed.

Not all wheat samples are capable of producing or promoting the disease. The difference between positive and negative groups could not be explained by the content of moisture, fluorine, lead, barium, copper, arsenic, zinc, or selenum of the two groups. The one consistent difference appearing to date is germination. Samples of wheat which seemed incapable of producing pullet disease after 12 weeks of feeding were high in germination and those which were regarded as positive were consistently low.

While the exact cause of pullet disease remains undetermined, this work verifies, for the first time, field observations that wheat may be concerned with appearance of the disease. It is likely that an important benefit of these observations will be increased ability to reproduce or facilitate appearance of the trouble, thus greatly aiding in the study of cause or causes.

Percent Edible Meat in Relation to Shank Length—From a random sample of New Hampshire cockerels and pullets raised in batteries for 12 weeks, 30 cockerels were selected arbitrarily, based on differences in shank length. The birds were not fed for approximately 15 hours before killing. The cockerels were each weighed, killed, dressed, chilled, and were then divided into three groups according to length of shank. One group of 10 with the shortest shanks and one group of 10 with the longest shanks were compared with respect to body shape and the percent of meat contributed by the breast, humeri, and legs.

The longer shanked birds had relatively shorter keels, narrower anterior and posterior body width, and approximately the same anterior body depth as the shorter shanked birds. The percentage weight of the breast, humeri sections of the wing, and legs was approximately the same in the two groups. The percentage of breast meat of the chilled dressed weight in the longer shanked birds was slightly greater than in the shorter shanked birds. The percentage of meat of the chilled dressed weight in the humeri sections of the wings and in the legs was approximately the same in both groups. The meat of the breast, humeri, and legs contributed 38.3 and 39.2 percent of the chilled dressed weight of the short-shanked and long-shanked groups, respectively. For both groups, these parts contributed about 70 percent of the total edible meat in 3-pound live birds.

The results secured indicate the importance of breeding for body shape which will give the largest possible yield of breast and leg meat and the economic advantage of including the humeri sections of the wings with breasts in selling cut-up chicken.

Sexual Maturity in Relation to Vent Eminence in Chicks—No relation was found between the size, shape, or texture of the genital eminence of day-old chicks and onset of sexual maturity among 200 Barred Plymouth Rock pullets originally classified at hatching time as to type of eminence.

Feather Pigment Identification of Leucosis—Avian leucosis in its various forms is one of the most serious diseases affecting the poultry industry. Further evidence was obtained that definite variations of feather pigmentation from the normal color are associated with certain forms of avian leucosis.

Based on previous work on feather pigmentation reactions in Brown Leghorn capons resulting from the injection of carcinogenic agents obtained from human cancerous females, it was concluded that the same feather pigmentation reactions occurred in untreated birds that became infected with the leucosis organism.

Efforts were made to determine whether microscopic examination of feather germs of live birds could be used as an indicator of the presence of leucosis. Feather germs were examined by Dr. Jungherr of the Connecticut Experiment Station.

Approximately 4-8 tissue samples for each of 20 birds were submitted for sectioning and microscopic study. Of these, 16 gave evidence of visceral lymphomatosis; one of liver necrosis; one of liver cirrhosis; and two cases were negative.

External Morphology of Turkey Embryo During Development

Embryonic mortality has been used quite extensively to evaluate different methods of incubation and to determine the effects of various nutritional factors on hatchability. To facilitate this work the embryonic development of the chick has been investigated thoroughly, but more extensive information pertaining to development of turkey embryo has been needed.

It was thought that a reliable method for estimating the age of any embryo that failed to survive the incubation period would be to make determination on the basis of external structural developments. Daily changes in structural development were studied with the aim of establishing the age of any turkey embryo on the basis of these morphological differences.

All of the embryos studied (183) were obtained from eggs produced by Black and the Beltsville small-white turkeys which were kept on the University poultry farm. All of the birds were trap-nested and the eggs were collected at least five times daily and held at a temperature of 52° F. until set. Except in a few cases (20) all of the embryos were obtained from eggs set at the same time. The eggs were incubated in a forced-draft machine which was operated at an average temperature of 99¾° F. and a wet-bulb reading of 81° F.

At completion of certain specified incubation periods a random selection of eggs was made and these were immediately immersed in ice water until the embryos were examined. Samples were taken at 12-hour intervals from the 24th to the 168th hour of incubation and at 24-hour intervals thereafter.

It was noted that age of egg and variety differences had a slight influence on the rate of embryonic development during the forepart of the incubation period. The Beltsville small-white turkey embryos developed slightly faster than those of the Black variety, and the embryonic development of the freshest eggs was slightly advanced.

Effect of Adrenal Cortex Hormone on Egg Production—Laying hens injected daily for nine consecutive days with a hormone solution of the adrenal cortex gave negative results, since egg production was neither stimulated nor inhibited. No ovarian injury occurred.

Daily intramuscular injections of an extract of the anterior lobe of the pituitary gland produced marked ovarian stimulation, but egg production was decreased. The ovaries of birds that were in a normal molt or were good egg producers showed the greatest injury on autopsy. The least amount of regression was found in pullets which had been laying for a short time only, as compared with hens or pullets that had been laying for several months.

PUBLICATIONS

BULLETINS

Number	Title	Authors
A26 (Tech)	Selection and Genetic Responses in a Segregating Maize Population	W. B. Kemp R. G. Rothgeb
A27	Factors Affecting the Nutritive Value of Soybean Oil Meals and Soybeans for Chickens	H. R. Bird G. J. Burkhardt
A28	Propagation of Apple and Quince by Layering	F. B. Lincoln
A29	Wages and Housing Facilities for Farm Labor	W. P. Walker S. H. DeVault
A30	Manual for Milk and Cream Testers in Maryland	C. W. England
A31	The War-Time Machinery Situation on Farms in Maryland	A. M. Ahalt W. P. Walker S. H. DeVault P. R. Poffenberger

SCIENTIFIC JOURNAL ARTICLES

Art. No.

A61 Egg Production in the Fowl as Influenced by a Combined Pituitary and Chorionic Gonadotropic Extract. R. E. Phillips. *Journal of Agricultural Research.*

A62 The Nature of Polyploidy in Lilium Tigrinum. R. N. Stewart and Ronald Bamford. *American Journal of Botany.*

A63 Soybean Disease Incidence in Maryland in 1942 and 1943. M. A. Petty. *Plant Disease Reporter.*

A64 A Laying Mash Containing No Animal Protein. H. R. Bird. *Flour and Feed.*

A65 Relationship of Specific Gravity and Shell Appearance to the Hatchability of Fertile Turkey Eggs. R. E. Phillips and C. S. Williams. *Poultry Science.*

A66 A Biochemical Study of Soil Organic Matter as Related to Brown Root Rot of Tobacco. E. D. Matthews. *Journal of Agricultural Research.*

A67a Effect of Colostrum on the Vitamin A and Carotene Content of Blood Plasma of Newborn Calves. L. A. Moore and M. H. Berry. (Abstract of paper presented at meeting of American Society of Animal Production).

A68 Dehydrated Pea Vines and Starfish Meal in Poultry Feeds. H. R. Bird. *Poultry Science.*

A69 Soil Capability Work in Maryland. R. P. Thomas. *Proceedings of Agronomy and Soil Science.*

A70 Comparison of Response of Turkey Poults and of Chicks to Different Forms of Vitamin D. H. R. Bird. *Journal of Nutrition.*

A71 External Morphology of the Turkey During the Incubation Period. R. E. Phillips and C. S. Williams. *Poultry Science.*

A72 A Preliminary Study of the Feather Germ Reaction to Urines from Tumorous and Other Human Subjects. Mary Juhn. *Archives of Pathology.*

A73 The Effect of Wheat Upon the Incidence of Pullet Disease or Blue Comb. George D. Quigley. *Poultry Science.*

A74 Pea Aphid Work in Maryland During 1943. L. P. Ditman, E. N. Cory, Howard B. Owens. *Journal of Economic Entomology.*

A75 A Method for the Extraction of Fat from Spray Dried Whole Milk Powder for the Determination of Vitamin A and Carotene. C. W. England and Frank E. Potter. *Journal of Dairy Science.*

A76 Tobacco Anthracnose, a Plant Bed and Field Disease. E. A. Walker and Sarah W. McInroy. *Phytopathology.*

A77 Spider Provisioning Habits of Several Mud-Dauber Wasps. Martin H. Muma and Walter F. Jeffers. *American Entomological Society.*

A78 The Value of Kelp Meal in Rations for Dairy Cattle. M. H. Berry and K. L. Turk. *Journal of Dairy Science.*

A79 Effect of Colostrum on the Vitamin A and Carotene Content of Blood Plasma of New-Born Calves. L. A. Moore and M. H. Berry. *Journal of Dairy Science.*

A80 Significance of the Hydrogen-Ion Concentration of Blueberry Leaves. Amihud Kramer and A. L. Schrader. *Plant Physiology.*

A81 Fermentation Solubles in Diets for Growing Chickens. H. R. Bird and J. P. Mattingly. *Poultry Science.*

A82 Addition of di-Methionine to Starting and Growing Mashes. H. R. Bird and J. P. Mattingly. *Poultry Science.*

A83 Hatchability as Influenced by Environmental and Different Storage Temperatures. R. E. Phillips. *Poultry Science.*

A84 Relationship between the Genital Eminence of Day-old Female Chicks and Age of Sexual Maturity. R. E. Phillips and C. S. Williams.

A85a The Feeding Value of Cheat (Bromus secalinus) for Dairy Cows. M. H. Berry, K. L. Turk, and L. A. Moore. (Abstract of paper to be presented at annual meeting of American Dairy Science Association.)

A86a Effect of Feeding Cod Liver Oil by Two Different Methods on Butterfat Test. L. A. Moore, G. T. Hoffman, and M. H. Berry. (Abstract of paper to be presented at annual meeting of American Dairy Science Assn.)

A87 Effect of Thiouracil on the Plumage of the Brown Leghorn Capon. Mary Juhn. *Endocrinology.*

MISCELLANEOUS PERIODICALS, REPORTS, PROCEEDINGS, ETC.

Number	Title	Authors
18	Proceedings of the Maryland Dehydration Conference. (Planographed bulletin.)	
19	The Performance of Hybrid Corn in 1943 (Planograph bulletin)	R. G. Rothgeb
20	Sweet Corn Field Trials in 1943. (Mimeographed Circular) ...	R. G. Rothgeb
21	Soybean Diseases on the Eastern Shore of Maryland. (Proceedings of Peninsula Hort. Society)	M. A. Petty
22	Bacterial Spot Disease of Peaches in Maryland. (Proceedings of Peninsula Hort. Society)	W. F. Jeffers E. A. Walker
23	Disease Control Problems in the Late Potato Crop. (Proceedings of Peninsula Hort. Society)	R. A. Jehle
24	Peach Varieties: What's in the Future? (Proceedings of Peninsula Hort. Society)	A. L. Schrader I. C. Haut
25	The Orchard Soil Fertility Program. (Proceedings of Peninsula Hort. Society)	A. L. Schrader
26	Principles of Sweet Potato Storage House Design and Management. (Proceedings of Peninsula Hort. Society)	George J. Burkhardt
27	Some Ascorbic Acid and Moisture Determinations on Fresh and Dehydrated Lima Beans. (Proceedings of American Society for Horticultural Science)	A. H. Thompson C. H. Mahoney
28	Edible Soybeans. (Proceedings of Peninsula Hort. Society) ...	E. P. Walls
29	Selection and Preparation of Vegetables for Freezing Preservation in Locker Plants. (Mimeographed Circular)	C. H. Mahoney E. P. Walls

CURRENT PROJECTS

AGRICULTURAL ECONOMICS

A-18. ORGANIZATION, OPERATION AND BUSINESS ANALYSIS OF MARYLAND FARMS.
  A-18-u. Farm Management Adjustments and Factors Encountered by Farmers in Attaining Increased Production in the Wartime Program.
  A-18-v. Post-War Needs of Farmers in Maryland.
  A-18-w. Trends in Farm Mortgage Financing in Maryland.

A-19. THE FARM TAX PROBLEM IN MARYLAND.
  A-19-d. Problems in Farm Income Tax Reporting and Record Keeping.
  A-19-e. Changes Needed in the Maryland Tax System by Virtue of Wartime and Post-War Governmental Finance.
  A-19-f. Practical Technique for Detailed Classification of Farm Land for Property Tax Purposes.

A-26. MARKETING OF AGRICULTURAL COMMODITIES.
  A-26-j. The Effect of Changes in Transportation on Marketing Systems for Maryland Farm Products.
  A-26k. The Problem of Priorities and Rationing in Relation to Agricultural Production and Marketing in Maryland.
  A-26-1. Prices Paid by Farmers for Commodities Bought.
  A-26-m. Problems in Marketing Arising from the War Emergency.

A-32. AN ECONOMIC STUDY OF LAND UTILIZATION IN MARYLAND.
  A-32-f. Farm Tenancy and Leasing Arrangements in Maryland.
  A-32-g. Inflationary Movements in the Farm Real Estate Market.

AGRICULTURAL ENGINEERING

R-6. Investigations of Grain Storage on the Farm.
R-9. Sweet Potato Curing and Storing.

AGRONOMY

B-39. Wheat—Hybridization and Selection.
B-41. Barley—Hybridization for Smooth Awns.
B-42. Hay, Forage and Pasture.

- B-43. Soybean Production in Maryland.
- B-44. Sweet Corn—Seed Production and Breeding.
- B-49. Improvement of Pastures in the Several Soil Provinces in Maryland.
- B-50. Development of Dent Corn Hybrids Specifically Adapted to the Corn-Growing Areas of Maryland.
- B-52. Effects of Different Short Rotations on Physical, Chemical, and Pathological Conditions in the Soil and on Crop Production.
- B-53. Curing of Maryland Tobacco.
- O-27. Field Studies of the Fertility Requirements and Management of Important Soil Types in Maryland.
  - O-28-b. A Study of the Formula and Analysis for Late Potatoes.
- O-33. Efficiency of Soil Fertility Management.
- O-43. Hydrologic Studies with Reference to Soil Moisture Conservation, Soil Fertility, and Flood Control.
- O-44. A Bio-Chemical-Biological Study of Means to Increase the Organic Colloidal Complex of the soil.
  - O-44-a. A Study of the Chemical and Physical Changes Produced in a Soil by the Formation of the Organic Colloidal Complex.
- O-45. Soil Fertility Investigations on the University Farms.
  - O-45-a. Influence of Various Fertilizer Ratios on Crop Yields and Soil Conditions Under Three Different Lime Levels.
  - O-45-b. A Study of the Availability of Phosphate Material.
- O-46. A Study of Methods of Estimating the Available Potassium in Maryland Soils by the Rapid Soil Testing.
- O-47. The Available Supplies and Relative Agricultural Values of By-Product Liming Materials of Eastern Maryland.
- —— Production of Grain Sorghums.
- —— Tobacco Investigations. (Coop. with USDA).
- —— The Improvement, Production, and Use of Rye in Maryland. (Coop. with Maryland Distillers.)

Agronomy—Seed Inspection

- N-7. Inspection of Seeds Sold Throughout the State.
- N-8. Examination of Samples from Seeds Sold Throughout the State.
- N-9. Examination of Samples Submitted to the Laboratory.

ANIMAL HUSBANDRY

C-6. Study of the Factors Which Influence the Production of Cured Pork Products of Desirable Quality and Palatability.

C-7. The Relative Net Energy Values of Barley in Comparison to Corn, and of Corn Silage in Comparison to Alfalfa Hay when Fed in Fattening Rations to Steer Calves.

C-8. Swine Breeding Investigations within the State of Maryland.

C-9. Wintering Rations for Pregnant Ewes.

C-11 Wintering Rations for Pregnant Beef Cows.

ANIMAL PATHOLOGY

D-44. Bovine Trichomoniasis—Diagnosis, Treatment, Control and Eradication.

D-46. Bang's Disease—Calfhood Vaccination.

D-48. The Formulation of a Control Program Against Fowl Cholera.

D-49. Diagnostic Tests Including Hematology in Swine Brucellosis and Capsule Formation in Brucella.

BOTANY

F-9. Cytogenetic Studies in the Genera Ipomoea, Gladiolus, and Tulipa.

F-10. The Effect of Inducing Polyploidy on the Drug and Oil Content of Some Plants.

F-11. The Occurrence and Use of Haploid Plants Resulting from Twin Seedlings of Pepper, Cantaloupe and Other Vegetable Plants of Importance to Maryland Growers.

F-12. The Native Plants of Maryland, Their Occurrence, Distribution and Economic Importance.

J-72. Potato Improvement and Disease Control.

J-78. DISEASES OF FRUIT CROPS.

J-78-a. Breeding Strawberries for Resistance to the Red Stele Disease Caused by *Phythophthora fragariae* Hickman.

J-80. DISEASES OF TRUCK AND CANNING CROPS.

J-80-a. Disease Resistance in Potatoes with Special Reference to Wilt and Late Blight.

J-83. Studies on Transmissibility of the Mild Streak Disease of Black Raspberries.

J-84. Control of the Diseases of Soybeans.

J-85. The Effect of Hormone and Chemical Treatments on Breaking the Rest Period of Seed Potatoes.

J-86. Control of Stem Rot of Sweet Potato by Sprout Treatment.

J-87. Treatments for Control of Seed and Soil-Borne Diseases of Vegetable Crops.

K-7. Physiological and Biochemical Aspects of Vegetable Storage.

DAIRY HUSBANDRY

G-11. Growth Data of Dairy Animals from Birth to Freshening Age.

G-27. The Vitamin A and Carotene Requirements of Dairy Calves.

G-28. Normal Age Variations of the Intra-ocular Tension of Dairy Cattle.

G-29. The Effects of Vitamin A Deficiency on the Central Nervous System of Dairy Calves.

G-30. Reproductive Efficiency in Dairy Cattle.

G-33. Effect of Vitamin A on Milk Production.

ENTOMOLOGY

H-29. INVESTIGATIONS OF THE BIOLOGY AND CONTROL OF INSECTS AFFECTING CANNING CROPS.

Sub. Timing of Pea Aphid Treatments.

H-35. Nursery Insects.

H-40. BIOLOGY AND CONTROL OF TOBACCO INSECTS.

Sub. 1. The Tobacco Horn Worms.

H-41. Biology and Control of Japanese Beetle.

H-42. Ecological and Physiological Factors Concerned with the Hibernation of Insects.

H-43. The Biology and Control of the European Corn Borer under Maryland Conditions.

H-45. Practicability of Migratory Bee-keeping in Maryland.

H-46. Concentrated Sprays.

HORTICULTURE

E-2. The Effect of Rootstocks on the Production and Quality of Apples.

L-68. Factors Affecting Maturity, Shipping and Storage Quality of Fruits.

L-72. RELATION OF SOIL MOISTURE, AGE OF PLANTS, ETC., TO FLOWER DIFFERENTATION AND QUALITY OF THE STRAWBERRY.

- L-72-a. The Economic Application of Plant Thinning and Renewal Methods in Commercial Strawberry Areas in Maryland.

L-73. ADAPTATION OF FRUIT VARIETIES AND NEW SEEDLINGS TO MARYLAND.

- L-73-a. The Growth and Fruiting Behavior of New Fruit Varieties, Strains, and Seedlings.

L-74. ENVIRONMENTAL FACTORS AND CULTURAL PRACTICES IN RELATION TO THE GROWTH AND FRUITING RESPONSES OF FRUITS.

- L-74-a. The Maintenance of Annual Bearing of Apple Varieties.
- L-74-b. The Relationship of Early Bearing to Subsequent Growth and Fruiting Behavior of Apple Varieties.
- L-74-c. Factors Associated with the Productiveness and Unproductiveness of the Delicious Apple.

L-76. A Diagnosis of Certain Abnormalities in Growth and Fruiting of Peaches in Maryland.

Q-58. FACTORS INFLUENCING YIELD AND QUALITY IN THE PRODUCTION AND PROCESSING OF VEGETABLES.

- Q-58-a. The Influence of Fertiliizer Placements and Analyses on the Yield and Quality of Vegetables Grown for Processing.
- Q-58-b. Grading Raw Products.
- Q-58-e. Dehydration of Horticultural Crops.

Q-67. The Value of Organic Matter in the Production of Vegetable Crops.

Q-74. A Study of Regional Adaptation of Certain Vegetable Crops and Varieties in Maryland.

Q-75. The Effect of Certain Factors on the Growth of Tomato Plants and the Quality of the Fruit.

Q-76. BREEDING AND GENETICS OF VEGETABLE CROPS.

- Q-76-a. Breeding New Strains of Vegetable Crops.
- Q-76-c. Breeding and Selection of a Fruitful Type of Lima Bean for Maryland.

Q-77. Crop Management Studies with Vegetable Crops.

Q-79. BASIC PHYSIOLOGICAL NUTRITION OF HORTICULTURAL PLANTS IN RELATION TO PLANT BEHAVIOR, FRUITFULNESS, ETC.

- Q-79-a. Cation-Boron Relationships in Sweet Potato Nutrition.

POULTRY

M-32. PHYSIOLOGY OF REPRODUCTION OF POULTRY.

- M-32-c. Endocrine Studies in Poultry.
- M-32-d. Hatchability Studies in Poultry.

M-33. FACTORS AFFECTING QUALITY OF POULTRY PRODUCTS.

- M-33-b. Determining Relative Proportion of Different Parts of "Cut-up" Chicken as Marketed and Price Relationship Between Drawn and Cut-up Chicken.

M-34. THE EFFICIENCY OF POULTRY IN THE UTILIZATION OF FEED.

- M-34-d. By progeny-test and breeding methods, Developing Strains of Purebred and Crossbred Poultry Excelling in Efficiency of Feed Utilization, etc.

M-35. NUTRITIVE REQUIREMENTS OF POULTRY.

- M-35-a. The Place of Soybean Meal in Poultry Rations.
- M-35-e. Phosphorus Requirement of the Chick as Affected by Source of Phosphorus and Vitamin D Intake.
- M-35-f. Variability of the Feeding Value of Soybean Oil Meals.

M-36. VIABILITY OF MARYLAND POULTRY.

- M-36-b. Resistance to Pullorum Disease in Chickens.
- M-36-d. Developing a Possible Test for the Presence of Avian Leucosis.
- M-36-e. The Role of Wheat in Pullet Disease of Chickens.

M-38. Gas Fumigation for Used Baby Chick Boxes.

M-41. Studies on the Possibility of Distinguishing by Plumage Markings Between Homozygous and Heterozygous Barred Plymouth Rock Males Used in Hatchery Flocks.

M-42. The Effect of Brooding Environment Upon Poultry.

M-43. THE EFFECT OF HORMONES ON GROWTH, FEATHER DEVELOPMENT, AND RELATED PROBLEMS.

- M-43-a. Relation of Thymus to Induced and Natural Molt.

CHANGES IN PERSONNEL

Appointments:

W. B. Kemp, Acting Director, October 1, 1943.
Ural G. Bee, Assistant Professor, Animal Husbandry, March 1, 1944.
Luther B. Bohanan, Assistant Agriculture Economist, May 15, 1944.
Cornelia Cotton, Cooperative Agent, An. Path., July 1, 1943.
Edgar H. Grater, Assistant in Horticulture, May 22, 1944.
Conrad Liden, Assistant Agronomist, August 1, 1943.
Agnes Louise Marks, Instructor and Res. Ast., October 1, 1943.
Kenton Reynolds, Assistant in Soils, September 8, 1943.
Emil S. Troelston, Associate Professor, Agr. Econ., April 16, 1944.
Mildred Whitlow, Instructor, Dairy Husb., April 15, 1944.

On Leave:

Roger B. Corbett, Director, October, 1943.
James B. Outhouse, Asst. Prof. Animal Husbandry, March 1, 1944.
Paul R. Poffenberger, Asst. Prof., Agr. Econ., November 24, 1943.
E. A. Walker, Asst. Prof. Plant Pathology, August 10, 1943.
Charles S. Williams, Asst. Prof. Poultry Husb., January 10, 1944.

Resignations:

H. R. Bird, Assoc. Professor Poultry Husbandry, May 15, 1944.
Joseph Cotter, Instructor Dairy Husbandry, July 15, 1943.
C. W. England, Professor Dairy Husbandry, March 15, 1944.
F. B. Lincoln, Associate Prof. Plant Prop., September 30, 1943.
K. L. Turk, Head, Dairy Husbandry, April 15, 1944.
Mark Welsh, Head, Animal Pathology, October 21, 1943.

Deceased:

Albert White, Assistant Agronomist, July 16, 1943.

FINANCIAL STATEMENT—July 1, 1943 to June 30, 1944

	FEDERAL FUNDS				
	Hatch	Adams	Purnell	Bankhead-Jones	For Agr. Investigations*
Balance June 30, 1943					
Appropriations 1943-44	$15,000.00	$15,000.00	$60,000.00	$30,259.72	
Receipts from sources other than Federal 43-44:					
State appropriations for agricultural investigations					$115,887.33
Industrial Grants					7,221.30
Sales					68,991.40
					$192,100.03
Balance brought forward July 1, 1943					35,293.67
Total					$227,393.70
Expenditures:					
Personal Services	$11,735.41	$12,003.68	$46,041.15	$22,844.52	$ 78,105.98
Travel	245.72		2,027.95	657.23	2,468.83
Transportation	3.62	45.93	67.70	3.25	979.06
Communication Service	10.30	6.16	20.22	30.40	892.39
Rents and Utility Service			20.00	372.63	1,149.33
Printing and Binding			794.06	62.00	967.71
Other Contractual Services	2.30	18.25	588.25	196.99	4,761.54
Supplies and Materials	1,860.08	2,501.77	6,984.89	4,869.62	61,823.48
Equipment	1,142.57	358.56	2,712.96	1,223.08	12,599.94
Land and Structures		65.65	39.80		4,925.01
Contributions to Retirement					8,840.00
	$15,000.00	$15,000.00	$59,296.98	$30,259.72	$177,513.27
Balances June 30, 1944			703.02		49,880.43
Totals	$15,000.00	$15,000.00	$60,000.00	$30,259.72	$227,393.70

*Including Bankhead-Jones Offset Funds.

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